

AMENDED CLAIMS

(as filed before the IPEA on October 13, 2004)

1. A method of creating a three-dimensional model of a
5 tangible existing object, the method comprising the
steps:
 digitizing the object to create a mesh model of the
 object;
 breaking the mesh model into bilinear surface
10 elements; and
 uniting the bilinear surface elements to a surface
 model or solid model of the object.
2. A method according to claim 1, wherein the mesh
15 model is polygon mesh.
3. A method according to claim 1 or 2, wherein the mesh
model is obtained from point cloud data of the object.
- 20 4. A method according to claim 1, wherein the bilinear
surface elements are triangular.
5. A method according to claim 1 or 4, wherein the
bilinear surface elements are NURBS patches.
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6. A method according to claim 1, further comprising
the step generating a finite element model from the
surface model or solid model.
- 30 7. An apparatus for creating a three-dimensional model
of a tangible existing object, the apparatus comprising:
 a digitizer for creating a mesh model of the object;
 and
 a data processor for executing the following data
35 processing steps: reading the mesh model; breaking the

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mesh model into bilinear surface elements; and uniting the bilinear surface elements to a surface model or solid model of the object.

5 8. An apparatus according to claim 7, wherein the digitizer creates a polygon mesh as the mesh model.

9. An apparatus according to claim 7, wherein the data processor generates a finite element model of the object
10 from the surface model or solid model.

10. An apparatus according to any of claims 7 to 9, wherein the data processing steps are executed in the data processor by software routines.

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11. A software product for creating a three-dimensional model of a tangible existing object, the software product executing the following data processing steps by software routines when it runs on a computer: reading a mesh model
20 of the object; breaking the mesh model into bilinear surface elements; and uniting the bilinear surface elements to a surface model or solid model of the object.

12. A software product according to claim 11, which
25 reads a polygon mesh as the mesh model.

13. A software product according to claim 11 or 12, which creates the bilinear surface elements by breaking the mesh model of the object into bilinear NURBS patches
30 through conversion into IGES format.

14. A software product according to claim 13, wherein the mesh model converted into the IGES format comprises exclusively surface elements of IGES entity #128.

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15. A software product according to claim 11, which generates a finite element model of the object from the surface model or solid model through CAD-FEM coupling.

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